Report to the Twenty-First Legislature
Regular Session of 2002

TASK FORCE TO CREATE A MASTER PLAN FOR WATER QUALITY AND FLOOD MITIGATION FOR WAIMANALO

Prepared by the

Department of Land and Natural Resources
State of Hawaii

in response to
House Concurrent Resolution 120, House Draft 1, Regular Session of 2000

December 2001

Fiscal Year 2000-2001
Report on the Establishment of a Task Force to Create a
Master Plan for Water Quality and Flood Mititgation for Waimanalo

This report is prepared pursuant to House Concurrent Resolution 120, House Draft 1, Regular Session of 2000.

This Concurrent Resolution requests the establishment of a task force to create a master plan for water quality and flood mitigation for Waimanalo.

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I. INTRODUCTION

House Concurrent Resolution (HCR) No. 120, House Draft (HD) 1 of the Twentieth Legislature, 2000 (Appendix A) requested the establishment of a Task Force to create a Master Plan for Flood Mitigation for Waimanalo. The Master Plan is to:

1. Identify the fundamental sources of Waimanalo's flooding problems;

2. Determine the most effective and economical methods for solving these problems;

3. Identify sources of funding that are currently available for solving Waimanalo's flooding problems; and

4. Determine the best way of applying these funds in a coordinated manner to solve Waimanalo's flooding problems;

The task force is to consist of the following representatives:

1) Director of the Department of Land and Natural Resources or the director's representative;

2) Director of the Department of Agriculture or the director's representative;

3) Director of Department of Transportation or the director's representative;

4) Representative from the Waimanalo Ahupuaa Watershed Council;

5) Representative from the Waimanalo Neighborhood Board;

6) Representative from the Waimanalo Health Center;

7) Representative from the Waimanalo Agricultural Association;

8) Representative from the Waimanalo Hawaiian Homestead Association;

9) Representative from the Waimanalo Community Development Corporation; and

10) Representative from any appropriate county agencies as determined by the Department of Land and Natural Resources.

II PHYSICAL BACKGROUND

Topography:

The Waimanalo Valley is located approximately 13 miles northeast of downtown Honolulu on the Windward side of Oahu, as shown in Figure 1. The drainage shed of Waimanalo is well defined by the Koolau Mountain Range, Aniani Nui Ridge, and Keolu Hills (Figure 2). Within these boundaries, the entire valley encompasses a land area of approximately 11 square miles, and has a topography which varies from low lying coastal plain along the shoreline to gently rising lands in the middle section, and steep Koolau Mountain cliffs at the upper regions.

The Valley floor occupies about half the Valley and has less than 12 percent slope. The foothill area has 12-20 percent slope and contains 5 percent of the land. Slopes vary from 20 percent to vertical in the remaining upper watershed. The highest point is Puu O Kona Peak at an elevation of 2,200 feet.

Land Use and Soils:

The watershed area is comprised of 6,132 acres of which 3,029 are in agriculture; 334 acres are in urban or residential use; 994 acres are set aside as military reservation; 257 acres are in parks and recreation usage; and 1,518 acres are in preservation. There are 105 farming units including nurseries with 822 acres irrigated.

Soils above Kalanianaole Highway include the Haleiwa, Hanalei, Pohakupu and Waialua series. These soils are high-plastic silts, but they have the characteristics of silty clays, silty clay loam and clay. The soils are usually deep and moderately well drained, except for the Hanalei which is somewhat poorly drained. Erosion hazard is generally slight. Soils below Kalanianaole Highway are Jaucus series or filled lands. The Jaucus soils are loose, single grain sands that exceed 5 feet of depth and are normally underlain by coral.

About 2,174 acres, excluding military and residential lands, are classified as prime and important farmlands. Approximately 56 acres on Bellows Air Force Station are classified as secondary wetlands in accordance with the classification system used in Hawaii.

Climate

The climate in Waimanalo ranges from hot and dry along the shore to wet and cool at higher elevations. Temperatures in town range from 56^{o}F to 89^{o}F with an average annual of 73^{o}F.

Prevailing winds are from the northeast, but sometimes southwest winds associated with Kona storms can damage crops. Average annual rainfall varies greatly across the Valley from below 30 inches at the shore to over 80 inches in the Koolaus. The maximum storm of record occurred on March 5 and 6, 1958 with over 18 inches of rain in 30 hours on the Valley floor.

Social and Economic Considerations

The population of Waimanalo Valley increased 50 percent from 5,126 in 1970 to 7,674 in 1980, according to the U.S. Census. The Valley has one of the highest proportions of native Hawaiians and part Hawaiians of any community on Oahu. Relative proportions are 65 percent in Waimanalo to 15 percent for all Oahu. Residents of the Valley generally have larger and younger families and lower per capita income than prevails for the rest of Oahu. Housing in Waimanalo is primarily single family, privately owned or being purchased, 67 percent as compared to 44.3 percent for Oahu.

Many residents in Waimanalo Valley have a common goal. They express a strong determination to retain the rural character of this Valley and an appreciation for the importance of a viable diversified agriculture in achieving their goal.

Only 2.6 percent of the work force is employed in agriculture–nearly all in the Waimanalo Valley. Honolulu is the source of most employment. There is very little commercial or service development in the Valley and most of the shopping is done in neighboring Kailua or Honolulu. Income from service and sales to tourists is relatively insignificant in the Valley. Current annual gross value of agricultural production in the Valley is estimated to exceed $12,000,000.

History and Land Ownership

Some of the earliest habitation sites are located on Bellows Air Force Station. 12 archeological sites, mostly religious temples (heiaus), have been identified in the watershed. The Waimanalo Irrigation System ditches have been determined eligible for the National Register of Historic Places.

In the land division (Great Mahele) of King Kamehameha III from 1846 to 1848, the approximately 7,000 acres Waimanalo Valley (ahupuaa) was reserved as “Crown Lands.” Between 1846 and 1951, native Hawaiians were awarded fee simple patents for their homesites and cultivated lands (kuleanas).

During the period 1850 to 1920, one family leased the King’s land and acquired about 200 acres of fee simple kuleanas. They raised livestock and later developed a sugar cane plantation and the Waimanalo Sugar Company. The Sugar Company was liquidated in 1947. Leased land was sublet to local farmers, and fee simple lands were sold. The Company leases on state land expired in 1953 and pressures for additional farmland led to the State selling 63 lots of about 9 acres each on the Valley floor.

In 1921, the Hawaiian Homes Commission Act listed most of the Valley floor as “available lands” but excluded military areas, cultivated cane lands, and beach lands. The first Hawaiian Homes Commission lots were made available in 1925. The Hawaiian Homes Commission assigned 30 lots in 1958.

Presently, the land ownership is in three major categories: by the Federal Government for Bellows Air Force Station, which was established in 1917 (994 acres); in fee simple (1,089 acres); and by the State (4,049 acres).

As shown on Figure 2, existing residential developments are primarily located close to or adjacent to Kalanianaole Highway. Bellows Air Force Base, Olomana Golf Course, and large parcels of vacant State owned lands dominate the flat coastal plain. Much of the land in the middle section between Hihimanu Street and Waikupanaha Street is privately owned and used for truck farming. The upper reaches of Waimanalo Valley, above Waikupanaha Street, are in conservation and agriculture.

Streams

The existing Waimanalo Valley drainage system consists primarily of overland flow to numerous natural water courses which reduce to 3 major stream outlets discharging into Waimanalo Bay. The 3 outlets are: Waimanalo Stream, which drains about 4.8 square miles, Inoaole Stream, which drains about 3.3 square miles, and an unnamed stream to the south which drains about 0.5 square miles.

Waimanalo Stream is a gaged perennial stream with an average discharge of 1.17 billion gallons, and Inoaole Stream is intermittent. The estimated peak flows into Waimanalo Bay for the most severe storm likely to occur once in 100 years are 14,000 and 13,000 cubic feet per second, respectively. Kailua Reservoir impounds flows on a portion of Waimanalo Stream.

This predominant agricultural valley relies heavily on irrigation. Lateral irrigation flumes and ditches at 3 elevation levels were installed to tap the stream flows. A network of small irrigation ditches and reservoirs operated by the State Department of Agriculture, is connected to the overall drainage system. However, this irrigation system, has minimal drainage utility for large storms since the conveyance capacities of the flumes and storage capacities of the reservoirs are limited.

III. DRAINAGE PROBLEM

General

The drainage problem in the Waimanalo watershed is characterized by small capacity channels, badly restricted by vegetation. The vegetation not only reduces channel capacity but produces debris that moves downstream during flood flows. This debris collects at channel restrictions such as bridges and culverts resulting in flow blockages. The channels are usually very steep in the upper reaches and flat in the lower reaches that extend through the sandy soils along the coastal soils. The drainage problem is complicated by the lack of understanding as to who has responsibility to perform the work.

Large areas of Waimanalo Valley become flooded during severe rain storms, primarily because of small stream carrying capacities, inadequate road crossings, and low lying coastal plains. During past severe storms, flood waters pond over low lying areas in the flat coastal plains, causing inundation of residential and commercial lands as well as roads and highways. Unlike the low flow velocities occurring in the ponding areas, storm waters flowing on steeper areas have high velocities, and become a greater hazard to life and property. In the steeper middle and upper sections of the valleys, overflowing waters have eroded agricultural lands, damaged crops, and partially washed out roadways.

Although dry most of the year, the Waimanalo Valley is severely affected during storms. As in most areas, the streams are shallow, overgrown with grass, and often incapable of carrying the large flows resulting from flash floods. The road culverts and bridges are inadequate and subject to obstruction by debris or siltation. These conditions often result in flooding of the adjacent lowlands, especially near the highway.

At least 10 major storms have inundated the watershed since 1941, and it is reasonable to assume more damages can be expected as developments increase. In 24 hours on March 5, 1958, rainfall of 13.8 inches was recorded. 11 families were marooned for hours when floodwater overflowed Waimanalo Stream and was 3 feet deep on Kalanianaole Highway. Crops and other property damages were high.

During other recorded floods, small road bridges were washed out, banana and papaya groves were destroyed, garages and houses collapsed from weakened foundations, families were evacuated, and a thick layer of mud was deposited on roads and properties.

Flooding in the Waimanalo area is a major concern. The attached map (Figure 3) shows the area covered by the worst flood estimated to occur once in a hundred years (1 percent chance of occurrence). Property and crop damages from flooding have been a continuing nuisance, but actual dollar damages have not been great. Problems include:

1. Poor maintenance of existing ditches, channels and culverts

2. No single agency responsible for maintenance

3. Irrigation ditches need manual adjustments for flood control

4. Kailua Reservoir releases can aggravate flooding

5. Local ponding behind channel walls and at roads

6. Land development potential restricted by flooding problems and floodplain zoning.

IV ENVIRONMENT

Concerns related to the human environment include the following:

1. Protection and improvement of the appearance of the landscape
2. Providing wildlife habitat
3. Preservation of prime unique farmlands
4. Protection of archaeological and historical sites
5. Protection of threatened or endangered species of wildlife
6. Preservation of wetlands
7. Solid waste disposal practices.

V. MAINTENANCE

The maintenance of Waimanalo and Inoaole Streams is inadequate due to the lack of understanding as to who has the responsibility to perform the work. Also, this problem is increased by rapid growth of vegetation, the land ownership pattern and the topography. However, some channel maintenance is perform adjacent to the Highway by the State Department of Transportation (DOT), City and County of Honolulu, and the State Department of Land and Natural Resources (DLNR). Also, the U.S. Air Force provides some maintenance along the channels that traverse Bellows Field.

To provide maintenance at a reasonable cost that could be performed by a public agency, access must be obtained along the entire reach of channel that would permit the use of heavy equipment. Since public agencies do not have the authority to enter and perform on private or leased property, a perpetual easement would have to be provided by the landowners to the public agency performing the work. This easement would need to be approximately 50 feet wide, 25 feet each side of the existing channel centerline. As long as the channel remains in private ownership, the only party legally eligible to perform channel maintenance is the abutting owner.

Bridge trash racks could be installed along the Hihimanu and Kakaina Streets bridge crossings to reduce the possibility of the plugging of these bridges and of the downstream road crossing. These racks would reduce the flood levels above the roads by catching floating debris. The racks could also be designed to move the debris to an area adjacent to the road, in order for it to be removed by heavy equipment.

VI. TASK FORCE RESPONSIBILITIES

The primary responsibility of the Task Force was to create a Master Plan for Flood Mitigation for Waimanalo. This would be accomplished by using DLNR's contract with URS Corporation (URS) to develop the Master Storm Water Drainage Plan for the Waimanalo Watershed. This would be one component of the Master Plan for Flood Mitigation for Waimanalo. Other components would include water quality, looking at sediment loads and pollution of the streams, erosion of stream banks, and addressing environmental issues.

Prior to convening the Waimanalo Flood Task Force, DLNR hired an engineering consultant firm, URS to develop the Master Stormwater Drainage Plan for Waimanalo, utilizing capital improvement project funds authorized by Act 328, SLH 1997, Item I-13.

Mr. Andrew Monden was appointed to represent Mr. Timothy E. Johns, Chairperson for DLNR on June 19, 2000 and to lead the Task Force on its responsibility to develop the Master Plan for Flood Mitigation for Waimanalo.

Letters were sent out to designated representatives on October 16, 2000 to activate the Waimanalo Flood Task Force. Two meetings were scheduled on October 23, 2000. The first meeting was held in the Engineering Branch Conference Room of DLNR for State and County officials only. The second meeting with all members of the Task Force was held at the Waimanalo District Park. The Scope of Work that the consultant will be doing was presented and input from the community for the development of the plan was requested.

On November 5 & 6, 2000, DLNR met with the Federal Emergency Management Agency (FEMA), Region IX to discuss the Flood Mitigation Assistance (FMA) Program and use of federal funds for the flood mitigation plan for Waimanalo. This meeting was the result of a request by Mr. Joe Ryan from the Waimanalo Neighborhood Board to amend the contract with URS to include analysis of water quality.

After meeting with FEMA, Region IX, it was determined to suspend the work on the Master Stormwater Drainage Plan for Waimanalo. Due to recent changes by the Stafford Act, the contract with URS could not continue without changing the Scope of Work for the contract and encompassing additional State matching funds which were not available. Also, the Department did not want to go against new federal guidelines for the use of the federal funds and possibly jeopardize future applications from the Flood Mitigation Assistance (FMA) Program.

As a result , DLNR sent a notice to URS on January 16, 2001 to suspend work on the Flood Mitigation Plan for Waimanalo due to changes in federal requirements in the Flood Mitigation Assistance (FMA) Program. DLNR was hopeful to revise the Scope of Work to fall within federal guidelines for use of the federal funds.

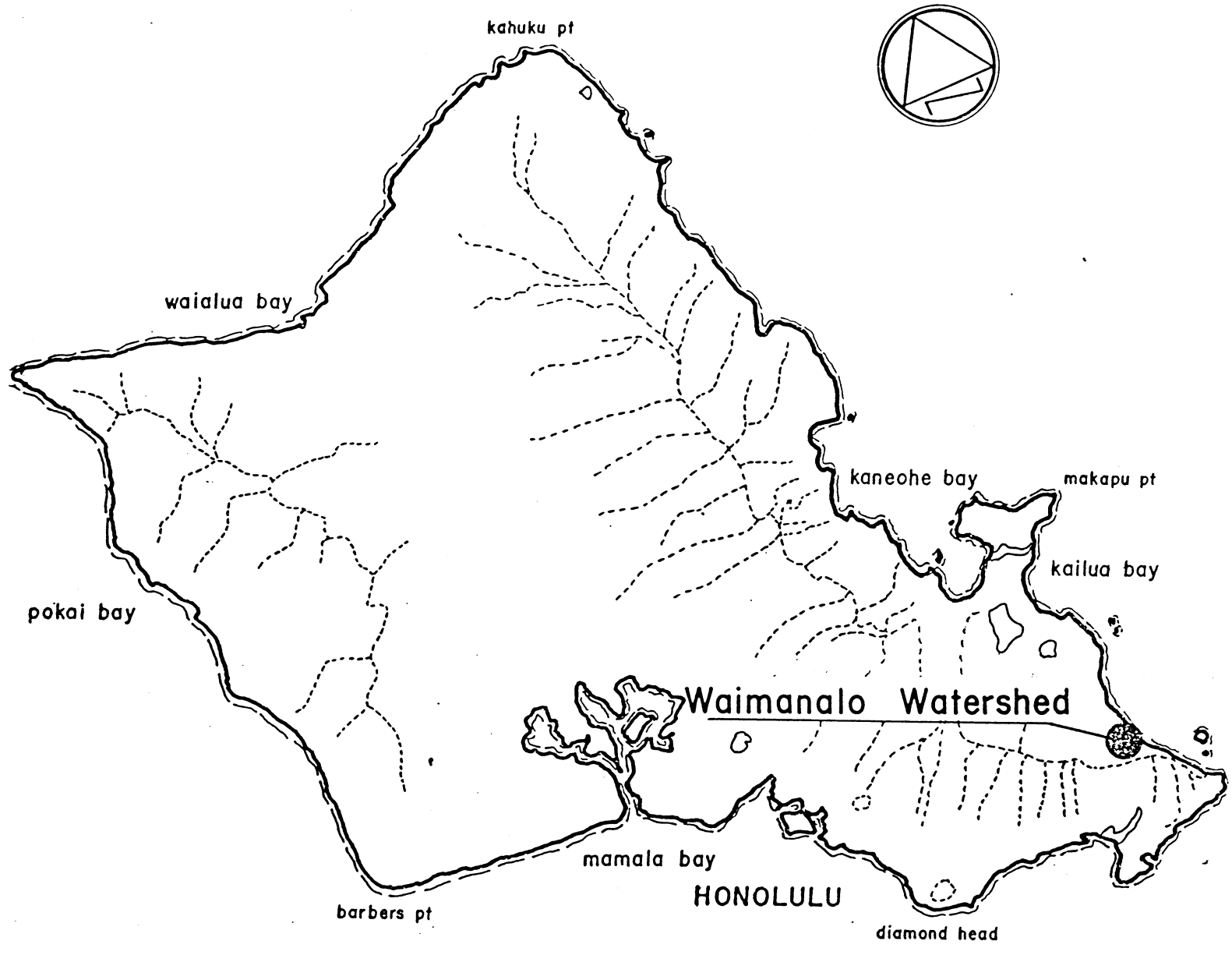
DLNR was not successful in revising the Scope of Work in order to fall within the federal guidelines under the Stafford Act and DLNR notified URS on November 5, 2001 to close the contract.

DLNR will schedule a meeting with the task force members to inform them of this setback to use the Master Stormwater Drainage Plan to develop the Master Plan for Flood Mitigation for Waimanalo. This does not completely stop its mission to develop a Master Plan for Flood Mitigation for Waimanalo and DLNR will continue to develop the Plan. The Task Force will look at alternate funding sources to complete the Master Stormwater Drainage Plan. A possible source of funds may be those allocated to the City and County of Honolulu Vision Teams, as Vision Teams may use their funds for flood studies. Other possible funding sources may include the Environmental Protection Agency (EPA), other County appropriations, or the Honolulu Board of Water Supply (BWS).

The Task Force will work with the various agencies who are developing reports for the Waimanalo Area. Reports such as the Water Quality Report and the Sediment Loading for the Waimanalo Area being developed by the State Department of Health through EPA funds will be obtained and used in the Master Plan. The Task Force will inventory all the various plans that are currently being done for the Waimanalo Area and include them in the Master Plan for Flood Mitigation for Waimanalo.

DLNR will be attending a meeting with FEMA officials in January 2002 to obtain guidelines and information on the FMA Program funds and other federal funding sources which possibly could assist us. Meanwhile, DLNR will request the U.S. Army Corps of Engineers to assist us in conducting a flood study of the Waimanalo Drainage System. They will be invited to attend our Task Force Meeting and present ways to utilize their services and expertise. DLNR will schedule a meeting with Task Force members in February 2002 to inform them of the latest developments.

In conclusion, as the Department no longer has the funding to develop a Master Plan for Flood Mitigation for Waimanalo, the Department does not have the master plan to submit to the Legislature in response to HCR 120, House Draft 1.



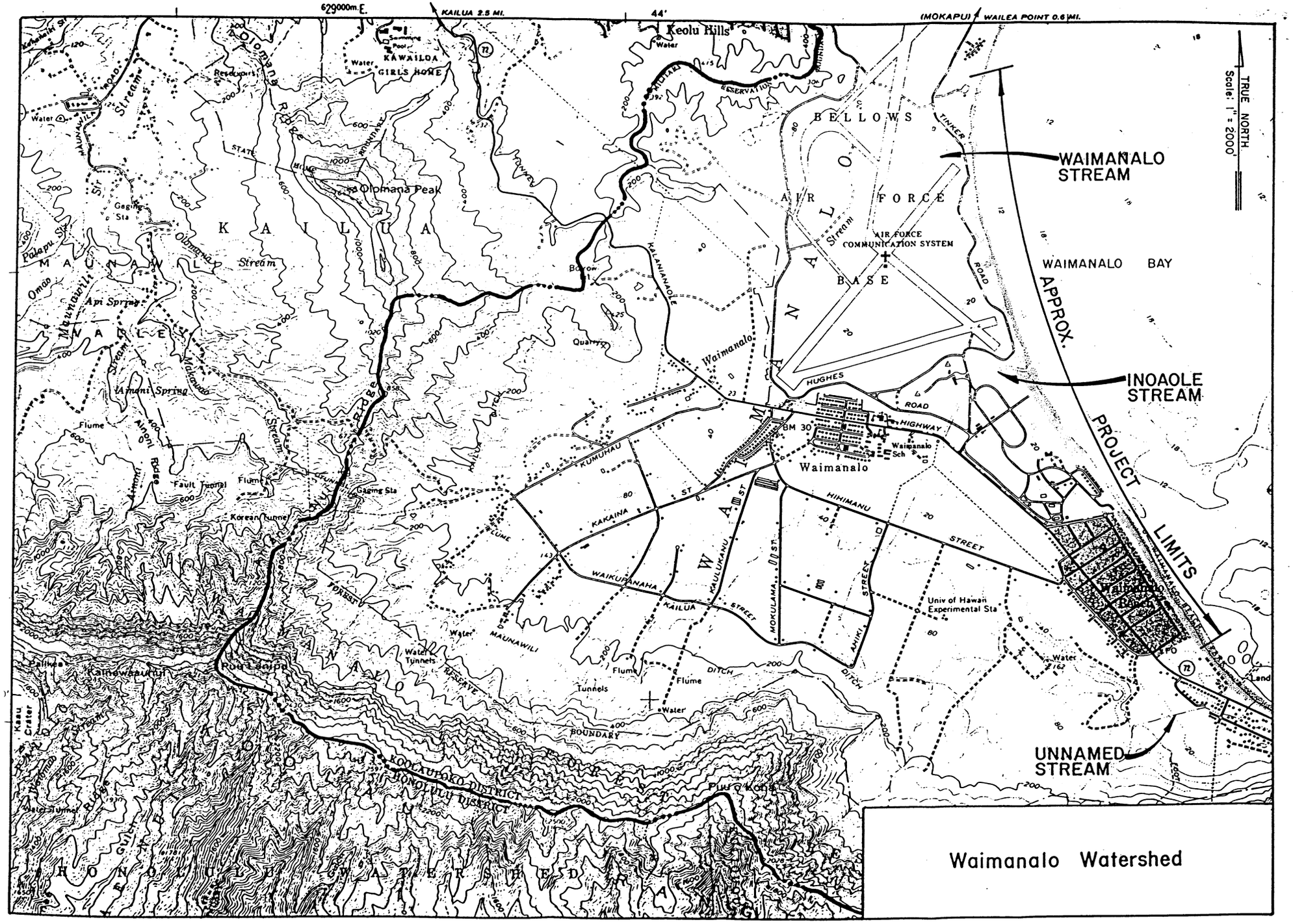
ISLAND OF OAHU

0 2 4
scale in miles

Waimanalo Watershed

LOCATION MAP

FIGURE 1


629000m.E.
KAILUA 2.5 MI.
44'
(MOKAPU) WAILEA POINT 0.6 MI.
Keolu Hills
KAWAILOA GIRLS HOME
Olomana Peak
K A I L U A
M A U N A W I L I
V A L L E Y
BELLOWS
AIR FORCE
BASE
AIR FORCE COMMUNICATION SYSTEM
WAIMANALO BAY
WAIMANALO STREAM
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APPROX. PROJECT LIMITS
UNNAMED STREAM
TRUE NORTH
Scale: 1" = 2000'
Waimanalo
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Waimanalo Beach
Olomana Ridge
Maunawili Stream
Olomana Stream
Api Spring
Amani Spring
Waimanalo Stream
Kalanianaole Highway
Hughes Road
Kumuhau Street
Kakaina Street
Waikupanaha Street
Kailua Street
Kaulukanu Street
Mokulama Street
Hihimanu Street
Ahiki Street
Maunawili Forest Reserve
Kaiwa Ridge
Kalihiwaa Ridge
Puu Lanipo
Kaiwa Ridge
Kaau Crater
Pali Lookout
Kaiwa Ridge
Koolaupoko District
Honolulu District
Water Tunnels
Tunnels
Ditch
Flume
Korean Tunnel
Fault Tunnel
Gaging Sta
Quarry
Reservoirs
Swimming Pool
Water
Land
P.O.
BM 30
Boundary
Reservation
Tinker
Road
Street
Highway
Ridge
Stream
Flume
Ditch
Tunnel
Forest
Reserve
Boundary
Water
Land
Waimanalo Watershed

FIGURE 2

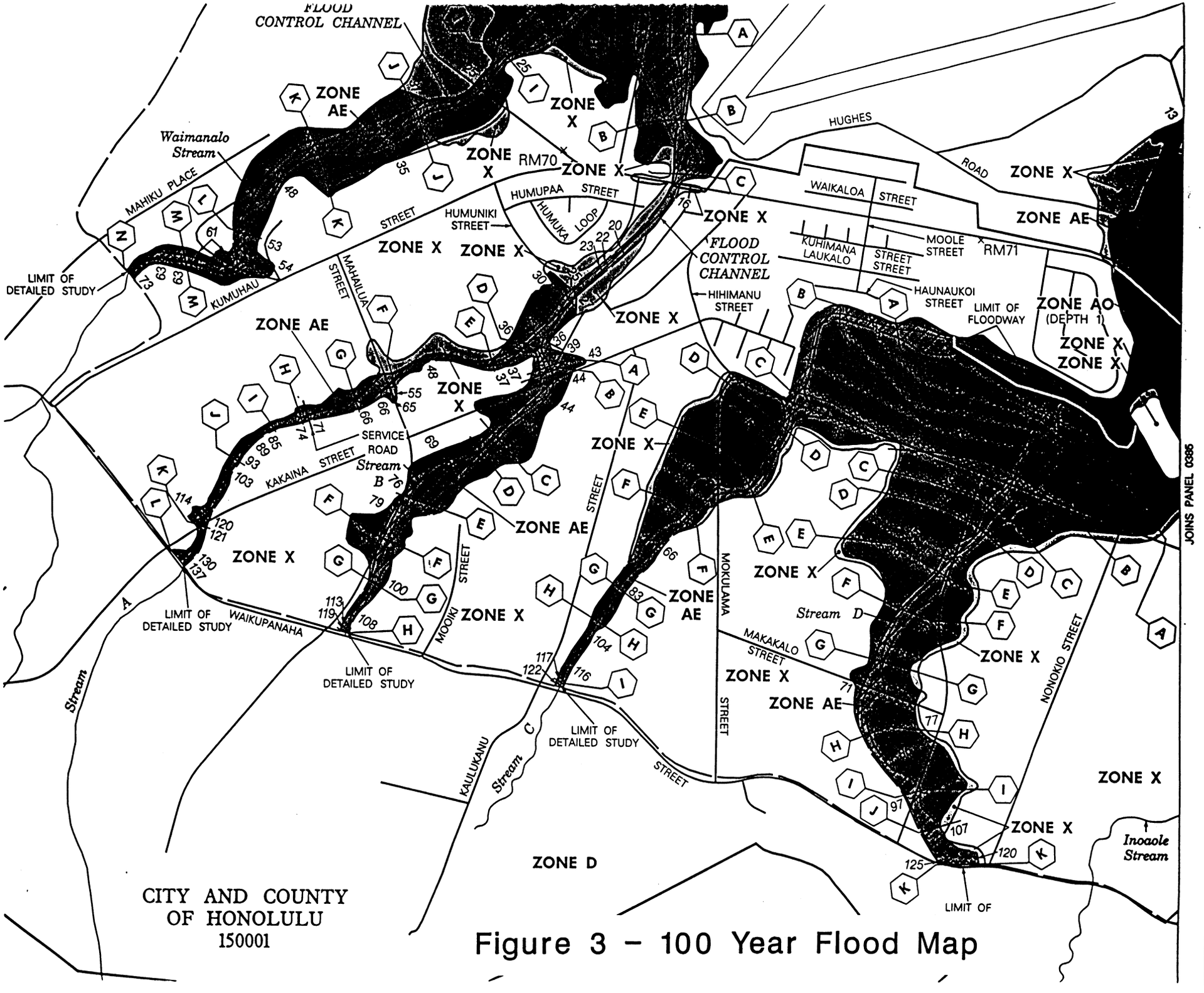

Figure 3 – 100 Year Flood Map

HOUSE OF REPRESENTATIVES H.C.R. NO. H.D. 1
TWENTIETH LEGISLATURE, 2000
STATE OF HAWAII

HOUSE CONCURRENT
RESOLUTION
REQUESTING THE ESTABLISHMENT OF A TASK FORCE TO CREATE A MASTER PLAN FOR FLOOD MITIGATION FOR WAIMANALO.

WHEREAS, the Kailua reservoir, the Kahawai stream, and other bodies of water in the Waimanalo area have caused serious damage to private property in the past and threaten to cause further damage to property and possible loss of life in the future; and

WHEREAS, pollution resulting from this periodic flooding combined with continuous agricultural and urban runoff has had serious negative consequences on water quality and water ecology not only in the freshwater streams of Waimanalo but also for the whole marine ecology of Waimanalo Bay; and

WHEREAS, the 1996-1998 Water Body Assessment conducted by the Department of Health's Environmental Planning Office identified Waimanalo stream as suffering from "severe impairment" of water quality as one of Hawaii's four most seriously polluted bodies of water; and

WHEREAS, the safety of our citizens and the protection of their property, as well as the purity and natural ecology of our waters are assets of the highest importance which this Legislature is bound to protect; now, therefore,

BE IT RESOLVED by the House of Representatives of the Twentieth Legislature of the State of Hawaii, Regular Session of 2000, the Senate concurring, that the Department of Land and Natural Resources is requested to convene a task force to advise the department in the development of a master plan for flood protection for the whole Waimanalo area; and

BE IT FURTHER RESOLVED that the Waimanalo flood protection master plan:

(1) Identify the fundamental sources of Waimanalo's flooding problems;

(2) Determine the most effective and economical methods for solving these problems;

APPENDIX A

(3) Identify sources of funding that are currently available for solving Waimanalo's flooding problems; and

(4) Determine the best way of applying these funds in a coordinated manner to solve Waimanalo's flooding problems;

and

BE IT FURTHER RESOLVED that the task force consist of:

(1) The Director of Land and Natural Resources or the director's representative;

(2) The Director of Agriculture or the director's representative;

(3) The Director of Transportation or the director's representative;

(4) A representative from the Waimanalo Ahupuaa Watershed Council;

(5) A representative from the Waimanalo Neighborhood Board;

(6) A representative from the Waimanalo Health Center;

(7) A representative from the Waimanalo Agricultural Association;

(8) A representative from the Waimanalo Hawaiian Homestead Association;

(9) A representative of the Waimanalo Community Development Corporation; and

(10) Any representatives from appropriate county agencies as determined by the Department of Land and Natural Resources;

and

BE IT FURTHER RESOLVED that the Department of Land and Natural Resources submit to the Legislature its master plan for flood protection for the Waimanalo area, no later than twenty days prior to the convening of the Regular Session of 2002; and

BE IT FURTHER RESOLVED that certified copies of this Concurrent Resolution be transmitted to the Chairperson of the Board of Land and Natural Resources, the Director of Agriculture, the Director of Transportation, the Waimanalo Ahupuaa Watershed Council, the Waimanalo Neighborhood Board, the Waimanalo Health Center, the Waimanalo Agricultural Association, the Waimanalo Hawaiian Homestead Association, the Waimanalo Community Development Corporation, and any county agencies represented on the task force.